

Workshop: Industrial symbiosis and the Case Studies



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 101022432 and the Government of Canada's New Frontiers in Research Fund (NFRF) and the Fonds de recherche du Québec (FRQ).



Case studies in Europe and in Canada



- ✓ Analysis of FlexSNG implementation potential in different market conditions in Europe and Canada based on:
 - techno-economic
 - socio-economic
 - environmental point of view

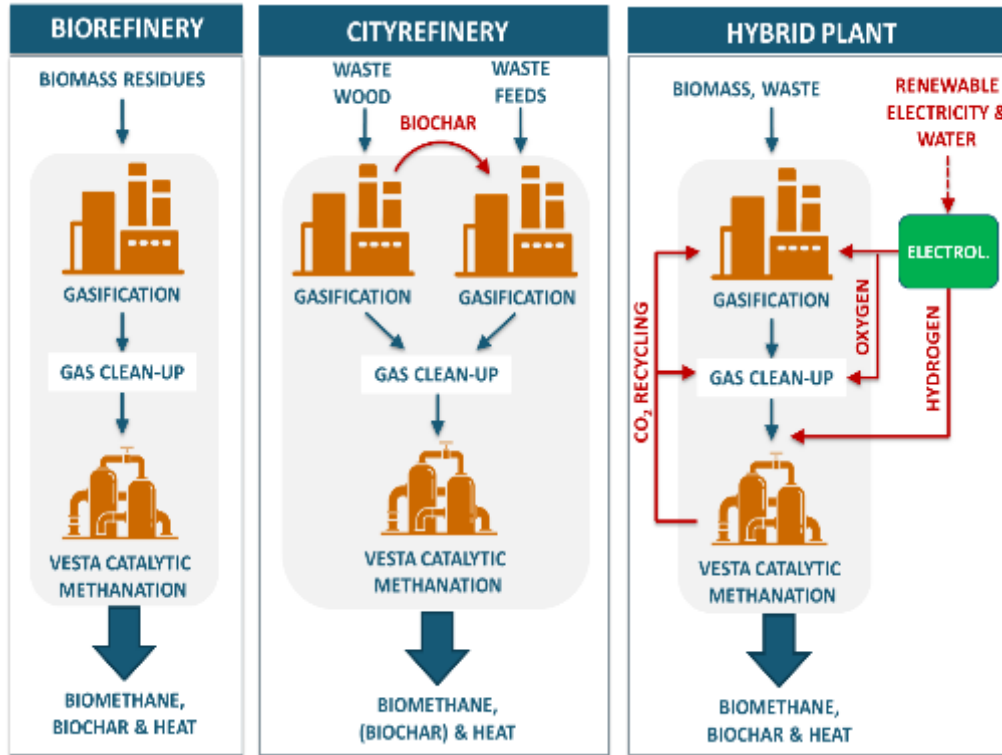
The implementation potential is analyzed in the context of regional characteristics and taking into account synergies between different energy carriers, energy conversion chains and industrial symbiosis.

- ✓ Case studies initially defined after the previous Consortium Meeting.
- ✓ A common benchmarking framework for case study techno-economic assessments **is currently being developed.**

Biorefinery/cityrefinery/hybrid FlexSNG plant

The FlexSNG plant can be tailored for both rural conditions to process a variety of biomass residues available from forestry, forest industry or agriculture (biorefinery), but also for urban environments where the feedstock base is more dominated by waste-derived materials (cityrefinery).

The gasification/synthesis process can also be coupled with electrolysis (hybrid plant) that will allow exploiting the surplus low-cost electricity available in the grid (typically in the summer season) and increasing the biomethane output of the plant by hydrogen boosting.



A. Case studies in Northern Europe – Finland & Sweden



Case Leader:
PM / VTT

Inspiring Case Study Site	Biomass Type	Thermal input (MW)	Final end products	Final products application
City refinery in Helsinki (Helen site)	Two parallel gasifiers operating: a. with SRF b. with demolition wood/urban waste wood	150 + 150	SNG biochar	<ul style="list-style-type: none"> ✓ SNG for regional heavy-duty road transport and by-product heat for district heating ✓ biochar for urban soil management
City refinery in Helsinki (Lahti Energia site)	Retrofitting the existing 80 MW air-blown CFB gasifier for steam/oxygen-blown operation and SNG production RDF (a mixture of industrial, commercial and building site waste, and some treated household waste)	80	CHP	<ul style="list-style-type: none"> ✓ Gas that is combusted in a gas boiler for CHP production
Bio refinery in Sweden (location probably Värö)	woody residues from the pulp mill	300	SNG biochar	<ul style="list-style-type: none"> ✓ Both end-products sold to external markets

B. Case studies in Central Europe – Germany & France



Case Leader:
EIFER

Inspiring Case Study Site	Biomass Type	Thermal input (MW)	Final end products	Final products application
Hybrid plant with electrolysis integration <i>(Close to Hambourg)</i> wind parks in the vicinity	Agricultural residues, solid manure, waste wood, possibly imported biomass	tbd	SNG biochar	<ul style="list-style-type: none"> ✓ SNG to replace Dutch natural gas (grid injection/electricity) ✓ biochar for urban soil amendment
Bio refinery plant by the replacement of natural gas in a lime kiln <i>(paper mill site Southern France)</i>	woody residues from the pulp mill, agricultural residues	20	SNG biochar	<ul style="list-style-type: none"> ✓ SNG or syngas production for the lime kiln ✓ biochar for agricultural use
City refinery <i>in Corse island</i>	woody residues from the pulp mill	tbd	SNG biochar	<ul style="list-style-type: none"> ✓ CNG for power and transport (vehicles and maritime such as ferries) ✓ biochar as high-calorific stored fuel



C. Case studies in Southern Europe - Greece



Case Leader:
CERTH

Inspiring Case Study Site	Biomass Type	Thermal input (MW)	Final end products	Final products application
City refinery plant <i>in Crete</i>	mainly RDF secondly agricultural residues (i.e. olive kernel, pruning)	20	SNG biochar	<ul style="list-style-type: none"> ✓ CNG for power and transport needs (public trucks & buses) ✓ biochar as fuel
2nd Greek case Rural or urban- not decided yet	MSW and agricultural residues	tbd	SNG	<ul style="list-style-type: none"> ✓ injection to NG grid



Thank you!



www.flexsng.eu

info@flexsng.eu

<https://www.linkedin.com/company/flexsng-project-h2020/>

<https://twitter.com/flexSNG>

